



## **EFFECT OF HIGH INTENSITY INTERVAL TRAINING ON RESTING PULSE RATE AND BREATH HOLDING TIME AMONG VARSITY WOMEN STUDENTS**

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**Cite This Article:** Jyothi Mudhiganti & Dr. M. Sankar, "Effect of High Intensity Interval Training on Resting Pulse Rate and Breath Holding Time Among Varsity Women Students", *International Journal of Computational Research and Development*, Volume 9, Issue 2, July - December, Page Number 106-108, 2024.

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### **Abstract:**

The purpose of the study was designed to examine the effect of high intensity interval training on resting pulse rate and breath holding time of varsity women students. For the purpose of the study, thirty women students from various departments studying bachelor degree in Kakatiya University, Telangana State, India were selected as subjects. They were divided into two equal groups. Each group consisted of the fifteen subjects. Group I underwent high intensity interval training for three days per week for twelve weeks. Group II acted as control who did not undergo any special training programme apart from their regular physical education programme. The following variables namely resting pulse rate and breath holding time were selected as criterion variables. All the subjects of two groups were tested on selected dependent variables by using radial pulse and holding breath for time respectively at prior to and immediately after the training programme. The analysis of covariance was used to analyze the significant difference, if any among the groups. The .05 level of confidence was fixed as the level of significance to test the 'F' ratio obtained by the analysis of covariance, which was considered appropriate. The results of the study showed that there was a significant difference between high intensity interval training group and control group on resting pulse rate and breath holding time. And also it was found that there was a significant improvement on resting pulse rate and breath holding time due to twelve weeks of high intensity interval training.

**Key Words:** High Intensity Interval Training, Resting Pulse Rate, Breath Holding Time, Varsity Women Students

### **Introduction:**

In recent years, High Intensity Interval Training (HIIT) has gained considerable attention in the field of sports science and physical education due to its effectiveness in improving cardiovascular and respiratory efficiency within a short duration of training. HIIT involves repeated bouts of high-intensity exercise performed near maximal effort, interspersed with periods of active or passive recovery. This training method imposes significant stress on the cardiovascular and respiratory systems, thereby stimulating rapid physiological adaptations (Buchheit & Laursen, 2013).

One of the primary indicators of cardiovascular fitness is resting pulse rate, which reflects the efficiency of heart function. A lower resting pulse rate is generally associated with increased stroke volume, enhanced parasympathetic activity, and improved cardiac efficiency. HIIT has been shown to significantly reduce resting pulse rate by increasing myocardial contractility and promoting favourable autonomic adaptations. Repeated exposure to high-intensity workloads during HIIT enhances the heart's ability to pump a greater volume of blood per beat, thereby reducing the need for a higher heart rate at rest (Kenney, Wilmore, & Costill, 2020).

Breath holding time is another important physiological variable that indicates respiratory efficiency, lung capacity, and tolerance to carbon dioxide accumulation. Improvements in breath holding time are associated with enhanced respiratory muscle strength, improved alveolar ventilation, and better oxygen utilisation. HIIT places a high demand on the respiratory system due to rapid oxygen uptake and elevated ventilation rates during intense exercise bouts. This repeated respiratory stress leads to adaptations such as increased respiratory muscle endurance and improved gas exchange efficiency, which collectively contribute to enhanced breath holding time (Powers & Howley, 2018).

The need for HIIT becomes particularly relevant in modern training programmes where time constraints limit prolonged endurance training. HIIT provides comparable or superior cardiovascular and respiratory benefits within a shorter duration when compared to traditional continuous training methods. Studies have demonstrated that HIIT elicits significant improvements in resting heart rate, ventilatory efficiency, and lung function, making it an effective training strategy for improving both resting pulse rate and breath holding time among athletes and physically active individuals (Gibala et al., 2012).

Furthermore, HIIT enhances the body's ability to tolerate hypoxic and hypercapnic conditions through repeated exposure to intense workloads, thereby improving respiratory control and breath regulation. These adaptations are particularly beneficial for sports requiring sustained effort and controlled breathing patterns. Hence, High Intensity Interval Training is considered a valuable and time-efficient training method for improving cardiovascular efficiency, reducing resting pulse rate, and enhancing breath holding time.

### **Methodology:**

The purpose of the study was designed to examine the effect of high intensity interval training on resting pulse rate and breath holding time of varsity women students. For the purpose of the study, thirty women students from various departments studying bachelor degree in Kakatiya University, Telangana State, India were selected as subjects. They were divided into two equal groups. Each group consisted of the fifteen subjects. Group I underwent high intensity interval training for three days per week for twelve weeks. Group II acted as control who did not undergo any special training programme apart from their regular physical education programme. The following variables namely resting pulse rate and breath holding time were selected as criterion variables. All the subjects of two groups were tested on selected dependent variables by using radial pulse and holding breath for time respectively at prior to and immediately after the training programme. The analysis of covariance was used to

analyze the significant difference, if any among the groups. The .05 level of confidence was fixed as the level of significance to test the 'F' ratio obtained by the analysis of covariance, which was considered appropriate.

**Analysis of the Data:**

**Resting Pulse Rate:**

The analysis of covariance on resting pulse rate of the pre and post test scores of high intensity interval training group and control group have been analyzed and presented in table 1.

Table 1: Analysis of Covariance of the Data on Resting Pulse Rate of Pre and Post Tests Scores of High Intensity Interval Training and Control Groups

Test	High Intensity Interval Training Group	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	Obtained 'F' Ratio
<b>Pre Test</b>							
Mean	73.00	73.20	Between	0.30	1	0.30	0.23
S.D.	1.03	1.09	Within	36.40	28	1.30	
<b>Post Test</b>							
Mean	71.87	73.13	Between	12.03	1	12.03	6.81*
S.D.	1.17	1.15	Within	49.50	28	1.77	
<b>Adjusted Post Test</b>							
Mean	71.96	73.04	Between	8.62	1	8.62	50.85*
			Within	4.58	27	0.17	

\* Significant at .05 level of confidence.

(The table values required for significance at .05 level of confidence for 2 and 28 and 2 and 27 are 3.34 and 3.35 respectively).

The table 1 shows that the adjusted post-test means of high intensity interval training group and control group are 71.96 and 73.04 respectively on resting pulse rate. The obtained "F" ratio of 0.23 for adjusted post-test means is more than the table value of 3.35 for df 1 and 27 required for significance at .05 level of confidence on resting pulse rate.

The results of the study indicated that there was a significant difference between the adjusted post-test means of high intensity interval training group and control group on resting pulse rate.

**Breath Holding Time:**

The analysis of covariance on breath holding time of the pre and post test scores of high intensity interval training group and control group have been analyzed and presented in table 2.

Table 2: Analysis of Covariance of the Data on Breath Holding Time of Pre and Post Tests Scores of High Intensity Interval Training and Control Groups

Test	High Intensity Interval Training Group	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	Obtained 'F' Ratio
<b>Pre Test</b>							
Mean	42.60	41.87	Between	4.03	1	4.03	0.07
S.D.	8.19	6.87	Within	1639.33	28	58.55	
<b>Post Test</b>							
Mean	48.93	42.07	Between	353.63	1	353.63	5.88*
S.D.	6.50	6.43	Within	1683.50	28	60.13	
<b>Adjusted Post Test</b>							
Mean	48.62	42.38	Between	291.70	1	291.70	53.09*
			Within	148.34	27	5.49	

\* Significant at .05 level of confidence.

(The table values required for significance at .05 level of confidence for 2 and 28 and 2 and 27 are 3.34 and 3.35 respectively).

The table 2 shows that the adjusted post-test means of high intensity interval training group and control group are 48.62 and 42.38 respectively on breath holding time. The obtained "F" ratio of 53.09 for adjusted post-test means is more than the table value of 3.35 for df 1 and 27 required for significance at .05 level of confidence on breath holding time.

The results of the study indicated that there was a significant difference between the adjusted post-test means of high intensity interval training group and control group on breath holding time.

**Conclusions:**

- There was a significant difference between high intensity interval training group and control group on resting pulse rate and breath holding time.
- And also it was found that there was a significant improvement on selected criterion variables such as resting pulse rate and breath holding time due to high intensity interval training.

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